

Comparison of physical activity level with sleep quality in premenopausal and postmenopausal women

Physical activity and sleep quality in menopause

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Abstract

Aim: The aim of this study was to examine the individual and combined associations of physical activity and sleep in premenopausal and postmenopausal women. **Material and Method:** Two hundred and fifty premenopausal (mean age: 45.50 ± 2.10) and 250 postmenopausal (mean age: 60.27 ± 3.03) women were evaluated. We compared age, body mass index (BMI), education, marital status, menopause age, jobs, medical conditions, smoking, physical activity and sleep quality using the Women's Health Initiative Insomnia Rating Scale between groups. The SPSS 22.0 program was used for the statistical analysis of the research data. Frequency and percentage (average, standard deviation) were used as descriptive statistics of the study. Non-parametric tests (Mann-Whitney U, Kruskal-Wallis, Spearman correlation test) were performed for comparison of the variables, which did not comply with the normal distribution. Significance was accepted as $p < 0.05$. **Results:** Sleep quality scores were better in premenopausal women when compared with postmenopausal women ($p < 0.000$). No significant differences were found in BMI ($p = 0.691$). The mean menopause age was 47.56 ± 4.91 in postmenopausal women. Postmenopausal women's physical activity and sleep quality was worse than in premenopausal women. Thirty-four premenopausal (14 of them walking, 8 of them swimming, 12 of them fitness) and 12 postmenopausal (8 of them walking, 4 of them swimming) women had physical activity. In all women, exercise training participants had better sleep quality. Those who exercised had better sleep quality in both groups ($p < 0.000$). No significant differences were found in sleep quality between those premenopausal and postmenopausal women who exercised. **Discussion:** Objective sleep measures differed significantly between the pre- and postmenopausal groups. These findings provide strong evidence that sleep qualities are more favorable in highly active women relative to less active women.

Keywords

Physical Activity; Sleep Quality; Premenopause; Postmenopause

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Introduction

The menopause period consists of three phases, premenopause, perimenopause, and postmenopause [1]. The “International Gynecology and Obstetrics Association Terminology Committee” refers to the period before the menopausal period in which the climacteric symptoms or findings can be seen with irregularities in menstruation, the period before the menopause (premenopause), and the period when the last menstrual period is observed as the perimenopausal period. Postmenopausal (menopausal) menopause is used to describe the next life cycle [2]. Changes in levels of reproductive hormones about four to five years before menopause lead to changes in menstrual cycle, vomiting, sleep disturbances, mood changes [3]. Prevalence of insomnia increases during menopause [4]. The most common complaints of women in this period after vasomotor changes are insomnia problems. On average, 50% of women complain of insomnia [5]. It has been reported that regular physical activity reduces vasomotor symptoms and sleep disturbances in the postmenopausal period [6]. To increase cardiorespiratory endurance in postmenopausal women, exercise programs should include aerobic exercise. The severity of aerobic exercise should be determined by the patient’s maximum heart rate. Muscle strengthening or weight transfer exercises contribute to the preservation and even enhancement of bone density. These exercises aim to improve flexibility, endurance, and strength should be intense and repetitive for various muscle groups [7]. The aim of this study is to examine whether there is a relationship between sleep levels and physical activity levels of women in the premenopausal and postmenopausal periods to assess whether sleep disorders in women with a high level of physical activity are seen at lower rates.

Material and Method

This study was conducted with a total of 500 healthy premenopausal and postmenopausal women in XXX Hospital with the decision of 55-12 taken from XXX University Clinical Research Ethics Committee. The written informed consent was obtained from all patients. Two hundred and fifty premenopausal women and 250 postmenopausal women were included in this study. According to the power analysis results, when the sufficient number of participants was reached, the study was finished. Age, height, weight, body mass index, education, marital status, menopause age, disease, smoking, physical activity, and sleep were assessed among the groups. Women’s Health Initiative Insomnia Scale (WHIIS) was used in the evaluation of sleep qualities. WHIIS is the Likert-type scale consisting of 5 questions. The first four questions of the questionnaire determine the onset of insomnia, the inability to sleep and the early morning wake-up. The last question is related to sleep quality. The response to each question is answered according to the individual’s experience, considering the frequency in the last 4 weeks and every week. In WHIIS, each item is scored from 0 to 4 and is evaluated according to the given. Zero points in the first 4 questions in WHIIS indicate that there are no problems related to insomnia 4 points indicate 5 times or more problems per week related to insomnia. The highest score on the scale indicates the greatest

degree of insomnia. The lowest score that can be taken from the scale is 0, the highest score is 20. Levine et al. have improved this scale [8]. Validity and reliability studies in our country were carried out by Timur and Sahin in 2009. It is a valid and reliable measure that can be used to assess complaints of insomnia especially in the menopausal period [9]. As a level of physical activity, women participating in the study were questioned how many days a week, how many minutes, and what type of sport they were doing (walking/running/fitness/swimming). Statistical analysis: SPSS 22.0 statistical program was used for data analysis of this study. In the study, frequencies, the percentage of central tendency measures (mean, standard deviation) were used as descriptive statistics. Nonparametric tests (Mann-Whitney U, Kruskal-Wallis, Spearman correlation) were used to compare the variables with non-normal distribution in analytical statistics. The level of significance was accepted as $p<0.05$.

Results

The mean age of the premenopausal women participating in the study was 45.50 ± 2.10 (40-48) years and the mean age of postmenopausal women was 60.27 ± 3.03 (55-65) years. The mean menopause age of postmenopausal women was 47.56 ± 4.91 years. Body mass indexes did not differ between premenopausal women ($28.10 \pm 4.89 \text{ kg/m}^2$) and postmenopausal women ($28.49 \pm 4.40 \text{ kg/m}^2$) ($p=0.691$) (Table 1).

Table 1. Comparison of sleep quality of women exercising and not exercising in premenopausal and postmenopausal period

		WHIIS Mean±SD (min-max)	z	p
Premenopausal period	Exercising	3.76±3.97 (0-15)	-4.956	0.000**
	Non-exercising	10.70±3.01 (3-15)		
Postmenopausal period	Exercising	1.16±0.98 (0-3)	-3.996	0.000**
	Non-exercising	11.01±3.28 (2-15)		

** $p<0.001$; Mann Whitney U test, WHIIS: Women’s Health Initiative Insomnia Scale, SD:Standart deviation

Thirty- four of the premenopausal women in the study and 12 of the postmenopausal women were doing regular physical activity. Among premenopausal women, 14 had walking activity, 8 swimming, and 12 were going to a fitness center; among postmenopausal women, 8 used walking and 4 swimming. The intensity and duration of exercises of premenopausal and postmenopausal women are shown comparatively in Figure 1. The mean sleep quality of women who did or did not exercise in the premenopausal and postmenopausal period is shown in Table 1. Both the premenopausal and postmenopausal women were found to have higher sleep quality and the correlation was statistically significant ($p<0.001$). In all women participating in the study, the sleep quality was found to be better for those who did regular physical activity ($p<0.001$) (Table 2). There was no statistically significant difference in sleep quality among premenopausal and postmenopausal women with physical activity ($p>0.05$).

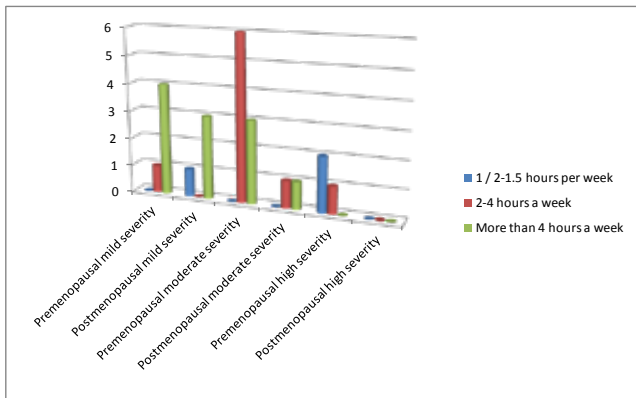


Figure 1. Exercise duration and severity of premenopausal and postmenopausal women

Table 2. Correlation between physical activity levels and WHIS of premenopausal and postmenopausal women

Spearman's test			WHIS	
	Premenopausal	Physical activity	r	
	Postmenopausal			

** p<0.001; r: Spearman's rank correlation coefficient. WHIS: Women's Health Initiative Insomnia Scale.

Discussion

Menopause is a natural transition period that manifests itself as the end of reproductive ability, which affects the lives of millions of women today, and as changes in vasomotor, psychological, urogenital, cardiovascular and musculoskeletal systems [10,11,12]. The aim of this study is to determine whether there is a relationship between physical activity levels and sleep levels in premenopausal and postmenopausal women. At the end of the study, women with higher physical activity levels were found to have a higher sleep quality in premenopausal and postmenopausal periods.

The menopause age range worldwide is 45-55 years; the mean age is 51 years [13]. The mean age of entry to menopause is specified as 47 with the mean age of entering to menopause in women participating in the study is 47.56 ± 4.91 years in Turkey as compatible with the literature.

Sleep disorders, which are among somatic symptoms in the transition to menopause, are very common. Gold et al. reported that approximately 30% of postmenopausal women aged 40-55 reported sleep disturbances [14]. In a study of 666 Finnish postmenopausal women, 20.6% of women identified sleep disturbances. Owen and Matthews have reported insomnia in about 42% of women [15]. The onset of insomnia in the postmenopausal period is characterized by a decrease in subjective sleep quality, an increase in nocturnal awakening, a decrease in total sleep time and sleep efficiency, an increase in the incidence of apnea and hypopnea during sleep, and a decrease in REM sleep [16]. According to the data from the national health institute, 35% to 60% of postmenopausal women are reported to have sleep disturbances. In a study with 1451 peri-postmenopausal women in Japan, the prevalence of insomnia was 50.8% [17]. Another study found that 45.7% of postmenopausal women had insomnia [18]. Ayrim et al. found that 57.8% of 206 postmenopausal women had poor sleep quality, 11.2% used

sleeping pills, and 13.2% had snoring complaints [19]. Women participating in this study were also found to have a moderate level of sleep quality, which was found to be higher in postmenopausal women.

There is a progressive decrease in aerobic fitness with age in females. Menopause causes a sedentary lifestyle by reducing exercise tolerance and maximum oxygen consumption [20]. Regular exercises are an indispensable element of a healthy lifestyle. Exercising is positively affected by menopause-induced vasomotor, sleep disturbances, and emotional state changes [21,22]. Especially regular exercise has proven to be a positive effect on sleep disorders [23]. Physical activity is inversely related to sleep disturbance. The rate of sleep disturbance is 31.2% for physically active women, while 60.8% for low active women [23]. Other studies have reported that regular exercise reduces the severity of menopausal symptoms [24].

In a study comparing postmenopausal symptoms with levels of physical activity, women who performed mild exercises such as recreational activities reported that they felt more comfortable [25]. According to another study, women in the postmenopausal period who were doing yoga reported that their insomnia complaints decreased and their quality of life increased. Aerobic exercises such as walking and swimming increase cardiovascular fitness, improve carbohydrate metabolism, improve blood lipid profile, reduce blood pressure and maintain bone mass. Often the recommended aerobic training program is to exercise 30-40 minutes for each session 3-6 times a week at 70% of maximum heart rate [26]. Most premenopausal women who participated in this study reported that most physical activity participants had 2 to 4 hours of moderate-intensity exercise per week, while the majority of postmenopausal physical activity participants reported having more than 4 hours of moderate-intensity exercise per week.

The limitations of the study include the low number of cases and the fact that the women living in different regions are not evaluated and not being evaluated by a validated questionnaire assessing physical activity.

Conclusion

As a result of this study, it was seen that women with higher physical activity level had higher sleep quality in pre- and postmenopausal periods. It can be considered that this study could be developed by including women from different wider groups and by questioning different kinds of exercises.

Scientific Responsibility Statement

The authors declare that they are responsible for the article's scientific content including study design, data collection, analysis and interpretation, writing, some of the main line, or all of the preparation and scientific review of the contents and approval of the final version of the article.

Animal and human rights statement

All procedures performed in this study were in accordance with the ethical standards of the institutional and/or national research committee and with the 1964 Helsinki declaration and its later amendments or comparable ethical standards. No animal or human studies were carried out by the authors for this article.

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Conflict of interest

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